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Adoption of treatment guidelines can be improved with high-intensity implementation strategies.

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Making Practice Guidelines Work: Community-Acquired Pneumonia

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Context: Properly implemented, medical practice guidelines can improve the quality and equity of health care for common illnesses. Their challenge lies in implementation. For example, numerous guidelines have been developed for the treatment of community-acquired pneumonia, but they are not effectively translated into clinical practice improvements. Successful strategies for guideline implementation can improve health care in many treatment areas.

Background

Community-acquired pneumonia affects about 4 million people and causes 1.1 million hospital admissions in the U.S. each year. Mortality varies from 1% to 10% depending on pre-existing health status and patient age. Despite research showing what treatments work best, patient care varies tremendously. For example, nationwide there is inconsistency in the timing of initiation and type of antibiotics that are used and little uniformity in who is admitted to the hospital or instead treated as an outpatient. There is also growing evidence of over-hospitalization, which greatly increases the cost of treating this illness. For these reasons, community-acquired pneumonia is a good focus for a quality improvement effort to standardize evidence-based care. The emergency department is an ideal setting for such a project since this is where nearly three-quarters of all hospitalized pneumonia patients begin their treatment.

Fine and colleagues devised the Emergency Department Community-Acquired Pneumonia Trial (EDCAP) to examine the effectiveness and safety of three guideline implementation strategies to improve the quality of care for patients with community-acquired pneumonia.

Methods

- The researchers developed practice guidelines for pneumonia based upon a review of evidence in the literature and the input of an expert panel that provided recommendations for the initial site of treatment and certain diagnostic and therapeutic processes of care. Blood oxygenation and the Pneumonia Severity Index, a measure based on demographic factors, co morbid illness, laboratory findings and the physical exam, were used to

The researchers devised and compared low-, moderate-, and high-intensity strategies for implementation of the EDCAP guidelines.

The moderate- and high-intensity strategies improved the likelihood that low-risk patients were appropriately treated as outpatients; but, the moderate-intensity strategy increased the chances that high-risk patients were inappropriately treated as outpatients.

stratify patients by risk and served as the foundations for the initial site of treatment (inpatient or outpatient) recommendations. The processes of care recommended for inpatients were: assessment of blood oxygen levels, performance of two blood cultures, administration of initial antibiotic in the emergency department within 4 hours of presentation, and use of an appropriate initial antibiotic treatment regimen. The processes of care recommended for outpatients were: assessment of blood oxygen levels, administration of the first dose of antibiotic in the emergency department, and use of an appropriate antibiotic treatment regimen upon discharge from the department.

- The EDCAP trial was conducted at 32 nonprofit teaching and non-teaching hospitals across 2 states (Pennsylvania and Connecticut).
- Sites were randomized to receive one of the three implementation strategies for a full year.
- **Low-intensity Implementation Strategy:** Collaborating Quality Improvement Organizations (QIOs) developed and disseminated a baseline report of performance on pneumonia quality indicators to participating hospital CEOs, quality improvement officers, and Emergency Department Directors and subsequently asked the participants for a quality improvement plan to address these initial pneumonia processes of care. The QIOs also provided educational materials on Medicare-mandated processes of care for pneumonia and educational tools for quality improvement. The research team then mailed the EDCAP guidelines to all Emergency Department medical providers that worked at the 8 sites assigned to this strategy.
- **Moderate-intensity Strategy:** The moderate-intensity strategy used all the activities of the low-intensity strategy with a few additions. The QIOs asked that the hospital-developed quality improvement plan also address the initial site of treatment in their quality improvement plan and the research team conducted an on-site education program that focused on the rationale for recommendations of the EDCAP guidelines for all Emergency Department medical providers at the 12 sites assigned to this strategy.
- **High-intensity Strategy:** The high-intensity strategy used all the activities of the low and moderate-intensity interventions plus provider-behavior change techniques that continued throughout the one-year guideline implementation period. Procedures were developed to implement real-time reminders to promote provider compliance with the guideline recommendations. Providers were given feedback on their compliance for each patient. All non-compliant providers were surveyed for their reasons for non-compliance. Sites convened plan-do-study-act teams on a bimonthly basis to review their progress toward goals and devised local quality improvement strategies to promote adherence to the guideline recommendations.

Results

- The EDCAP study enrolled 3615 patients overall with a median of 113 patients at each site.
- Low-risk patients in the moderate-intensity (61.0%) and high-intensity groups (61.9%) were significantly more likely to be treated as outpatients than were those in the low-intensity group (37.5%).
- Higher-risk patients in the moderate-intensity group were three-times as likely to be treated as outpatients (9.6%) than those in the low-intensity (2.4%) and high-intensity (3.2%) groups.

- Outpatients in the high-intensity group were significantly more likely to receive the first dose of antibiotic therapy and guideline-compliant antibiotic therapy in the Emergency Department and upon discharge from the emergency department. These patients were also more likely to receive all 4 guideline-recommended processes of care.
- Inpatients in the high-intensity group were more likely to receive blood cultures prior to antibiotic administration, to receive guideline-compliant antibiotic therapy, and were also more likely to receive all 4 guideline-recommended processes of care.

Table 1: Compliance with Guidelines by Intensity of Implementation Strategy

	Strategy Intensity		
	Low % of Patients	Moderate % of Patients	High % of Patients
Outpatients			
Oxygenation Assessment	94.8	95.6	96.7
1st Dose of Antibiotic in ED*	64.9	70.1	90.9
Appropriate Antibiotic Used in ED*	29.3	30.7	65.6
Appropriate Antibiotic Prescribed at Discharge from ED*	80.5	89.2	90.7
All 4 Processes of Care Performed*	5.3	28.3	60.9
Inpatients			
Oxygenation Assessment	96.3	99.1	97.4
2 Blood Cultures Performed before Antibiotics Initiated*	53.5	57.6	74.2
Antibiotics Initiated within 4 Hours of Presentation	77.0	79.7	78.8
Appropriate Antibiotic Administered in ED*	50.0	59.6	74.3
All 4 Processes of Care Performed*	23.0	30.1	44.3

* Statistically significant ($p < .05$); ED=Emergency Department

- Patients at low, moderate, or high-intensity sites experienced similar 30-day mortality, medical complications, and return to usual activities, indicating that there were no significant differences in the safety of the three interventions.

Implications

For most measures, successful implementation was more likely with more intensive guideline implementation strategies. The most effective strategy involved a host of tactics, including provider education, reminders, and audit and feedback, combined with site-level quality improvement activities undertaken in the emergency department, indicating that practice guidelines for the treatment of community-acquired pneumonia can elevate the quality and efficiency of care that patients receive, but it takes dedicated reinforcement and implementation strategies.

Similar improvements were not achieved for all quality measures, suggesting that guideline implementation strategies need to be tailored to the targeted processes of care.

These findings have direct relevance to medical providers, hospitals, insurers and health plans that seek to improve the quality, equity, and efficiency of health care for patients with community-acquired pneumonia. They also have relevance for quality improvement efforts focused on other acute medical illnesses managed in the emergency department.

The high-intensity strategy improved compliance with the guideline-recommended processes of care most often

This issue of the CHERP Policy Brief is based on the following publications: Yealy DM, Auble TE, Stone RA, Lave JR, Meehan TP, Graff LG, Fine JM, Obrosky DS, Mor MK, Whittle J, Fine MJ. *Effect of increasing the intensity of implementing pneumonia guidelines: a randomized, controlled trial*. Ann Intern Med. 2005 Dec 20;143(12):881-94 and Yealy DM, Auble TE, Stone RA, Lave JR, Meehan TP, Graff LG, Fine JM, Obrosky DS, Edick SM, Hough LJ, Tuozzo K, Fine MJ. *The emergency department community-acquired pneumonia trial: Methodology of a quality improvement intervention*. Ann Emerg Med. 2004 Jun;43(6):770-82.

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